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HOW DOES THE SUCCESSFUL LOW BIDDER GET LOW AND MAKE MONEY????

by

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----- ABSTRACT

This paper shows many simple to complex ideas and methods for \$100,000 to \$65,000,000 projects Contractors have used to rise above the competitive bidding system to be successful. These projects are: Goodwill-Warehouse-Office, Orlando Girls High School, Church of the Resurrection, Jacksonville-church-school, Jacksonville University Lift-slab Dormitory, Orlando Interstate Expressway, Cape Kennedy Umbilical Tower at Launch Complex 17, Alterations to Launch Complex 34 Mobile Service Structure (MSS) and Kennedy Space Center's Launch Complex 39 MSS and the Vehicle Assembly Building - the world's largest building at the time of construction. This presentation is meant to challenge your thinking -- call it Conceptual Estimating, Brainstorming, Imagine-Engineering or better yet call it an Application of Cost Engineering -- the scientific techniques applied to problems of Cost Estimation, Cost Control and Profitability.

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CHAPTER 10

"HOW TO GET LOW AND MAKE DOUGH"
OR
HOW DOES THE SUCCESSFUL LOW BIDDER
GET LOW AND MAKE MONEY????

In this chapter I will tell you many simple to complex ideas and methods for \$100,000 to \$65,000,000 projects Contractors have used to rise above the competitive bidding system to be successful. These projects are: Goodwill-Warehouse-Office, Orlando Girls High School, Church of the Resurrection, Jacksonville church-school, Jacksonville University Lift-slab Dormitory, Orlando Interstate Expressway, Cape Kennedy Umbilical Tower at Launch Complex 17, Alterations to Launch Complex 34 Mobile Service Structure (MSS), and Kennedy Space Center's Launch Complex 39 MSS and the Vehicle Assembly Building - the world's largest building at the time of construction. This series of stories is meant to challenge your thinking -- call it Conceptual Estimating, Brainstorming, Imagine-Engineering, or better yet, call it an Application of Cost Engineering -- the scientific techniques applied to problems of Cost Estimation, Cost Control and Profitability.

INTRODUCTION

Soon after graduation from the University of Florida in 1959, my new boss said "Construction is the biggest legalized gambling racket in the country." Startled as I was, I came back with "What about the stock market?" since I was also a new student of the stock market. Our discussion, pro and con, continued on, but my thoughts often go back to his statement as I hear talk about construction, legalized gambling, the recent drastic falls in the stock market, etc. A better question might be "Is construction or the stock market the biggest legalized gambling racket in the country?"

Since then, while estimating or reviewing over two billion dollars worth of cost estimating, I have often said "They bid that job too low" or "They would lose their shirts on that job" or "They can have it at their bid as we couldn't make any money on that job." Many contractors have said the same thing and many have gone broke trying. But time has taught me that many have succeeded in their construction bids. So much so that in 1971 I started making a personal study while looking at the more positive point of view. Since landing on the moon was once impossible, it is still one of Man's greatest success stories. The building of today's spaceport at Kennedy Space Center, Florida, has been one of construction's greatest success stories with the (impossible?) launching of the Apollo Space Vehicles to the Moon ahead of schedule.

So you can see by these stories that the successful low bidder can get low and make money even though construction may be the biggest legalized gambling racket in the country.

Construction Management and a Team Effort

My first story goes back to 1960 when Mr. Jim Ingram of Goodwill Industries of Jacksonville asked our company to design and build a 30,000 square foot low cost Display Manufacturing & Warehousing Facility for them to consolidate their many outlets. (Today this might have been called a C. M. ((Construction Management)) job. That is where the owner hires a firm to manage the design, criteria, estimating, contracting, building, and operation, etc.) We designed the most economical building - a Jumbo Brick Truck Loading Height Facility with the display and office area air-conditioned. We submitted a proposal to build it for \$113,000 or \$3.76 per square foot. This was accomplished with the special help of our subcontractors (who also helped with the most economical design of their portions.) Goodwill was happy with our figure, but some of the owner's representatives thought it should be bid to ensure competition. Since this was a team effort, we wound up the successful low bidder. (See Summary of Detail, Estimate A)

Special Custom Shoring System and Sub-Combination

My next story is about how we custom-designed a shoring system and analyzed the right subcontractor combination for the St. Pius Church-School also located in Jacksonville. Our low bid of \$176,000 was based on a Reusable Blocking Bracing System that our company developed, using 2 x 4 and 2 x 6 blocking, saving shoring labor and materials. We were also able to reuse the 2 x 4's and 2 x 6's in the wood partitions, thus saving on the material cost. (See Sketch - Custom Design Wood Blocking System) Our superintendent was skeptical but later quite satisfied and proud. Another major item was analyzing our window wall sub-bid and breaking it into smaller bids -- glass, panels, caulking, and solar screen. (See Detail Cost Estimate, Summary B)

Figured Four Ways

My third story is about one we figured four ways - and got low, Since the company didn't have enough money, it wasn't awarded, but we were the successful low bidder for the redesigned Resurrection Church by Jacksonville University. We figured the Concrete Vaulted Roof four ways to get low. (See my sketch, Resurrection Church)

1. On-site, pre-cast in sand-mortar mix and lift into place.
2. Cast in-place with reusable wood forms - with forklift to lift and move forms.
3. Cast in-place with reusable tin/wood forms - with forklift to lift and move forms to site.

DETAILED COST ESTIMATE SUMMARY

Goodwill Industries
4533 Lenox Avenue
Jacksonville, Florida

30,252 S.F. \$112,600

St. Pius School

1470 W. 13th Street
Jacksonville, Florida
Bid - January 17, 1961

17,271 S.F. Concrete, Masonry, Steel & Tectrum
Architect - Kemp & McDonald

SITE WORK SUB	5,026
CONCRETE FOOTING & FOUNDATION	7,300
REINFORCING STEEL MAT.	860
REINFORCING STEEL LABOR	275
LOW COST FORMS - FOUNDATION	350
CONCRETE SLAB @.38/SF S	11,500
8" JUMBO BRICK 34M - M	4,200
8" JUMBO BRICK 34M - L	6,500
ELECTRICAL SUB CONTRACT	3,613
PLUMBING SUB CONTRACT	4,288
STRUCTURAL STEEL SUB CONTRACT	13,300
OVERHEAD DOORS/SASH	1,058
ASBESTOS SOFFET	300
MILLWORK	340
CARPENTRY LABOR	1,172
VENTILATION EXHAUST FAN	1,244
DRYWALL SUB	800
GYPSUM ROOF DECK @.292/SF S	8,745
5 PLY BUT & G ROOF @.157/SF S	4,750
PRESTRESSED DOUBLE TEES S	227
ACOUSTICAL TILE CEILING S	2,703
CEILING INSULATION	500
FLOOR TILE S	2,673
VITRO GLAZE TILE RR S	591
STORE FRONT GLASS & GLAZ. S	2,472
AIR CONDITIONING S	4,414
PAINING & CAULKING S	800
FINISH HD. & MISC.	400
SUPERVISION & OVERHEAD	6,000
DESIGN (IN-HOUSE)	5,000

SUB-TOTAL 103,401

PROFIT 9,200

BID 112,601

COMPLETED DECEMBER 3, 1960

MISC. TESTING	600
SITE-CLEAR, FILL S	1,800
LANDSCAPE S	840
TERMITE S	440
FOOTING EXCAVATION L	800
CONCRETE FT & GB L&M	1,400
REINFORCING STEEL L&M	2,149
CONCRETE SLABS/c./BS	6,000
FORMS LABOR	1,854
SOLITE BLOCK L&M	5,933
GLASS BLOCK 912 L&M	3,280
MISC. GROUT	185
STRUCTURAL STEEL S	24,230
FIBER DECK 1" & 2" S	6,537
ROOFING S.M. & SKYDOMES S	3,570
MISC. METAL - FP, LET. PQ.	2,146
DOORS, FR. LOUVERS	4,738
TOILET PARTITIONS S	1,200
WINDOW WALL & SOLAR SCR. S	16,660
DRYWALL S	860
PLASTER & STUCCO S	3,696
HARD & SOFT TILE S	7,140
GLASS & GLAZING S	2,187
ELECTRICAL S	13,600
PLUMB., HEAT, VENT. S	30,000
PAINT, CAULK & WINDOW WALL S	8,333
GLAZED CEMENT ENAMEL S	1,160
SUPERVISION & CARP. LABOR	7,250
LUMBER	666
MILLWORK S	1,607
ROUGH HARDWARE	150
FINISH HARDWARE	3,810
CHALK BOARDS S	1,378
FOLDING DOOR	144
CLEAN-UP	250
JOB O.H. TOOL, OFFICE TOIL., ETC.	900
LABOR TAX @12%	1,650

SUB-TOTAL 169,143

PROFIT 6,857

BID 176,000

"A"

"B"

S = SUB
L = LABOR
M = MATERIAL
OH = OVERHEAD

ST. PIUS CHURCH SCHOOL

JACKSONVILLE FLORIDA

5
6

2ND FLOOR CONCRETE SLAB

← ST. BEAM FRAMING

STEEL POST SHORE →

1" FIBRE ACOUSTICAL
DECK FOR FORM

CONVENTIONAL METHOD

1. ST. SHORE CAUSE CLUTTERED WORK AREA
2. ST. SHORES MUST BE RENTED

11'0" ±

1ST FLOOR SLAB

2ND FLOOR CONCRETE SLAB

← ST. BEAM FRAMING

← 2-2x6

2x4 Wood Blocking

SHIM
WOOD

1. LOWER COST

2. EASILY REMOVABLE

3. 2x4 & 2x6 REUSABLE IN
2x6 WOOD PARTITIONS

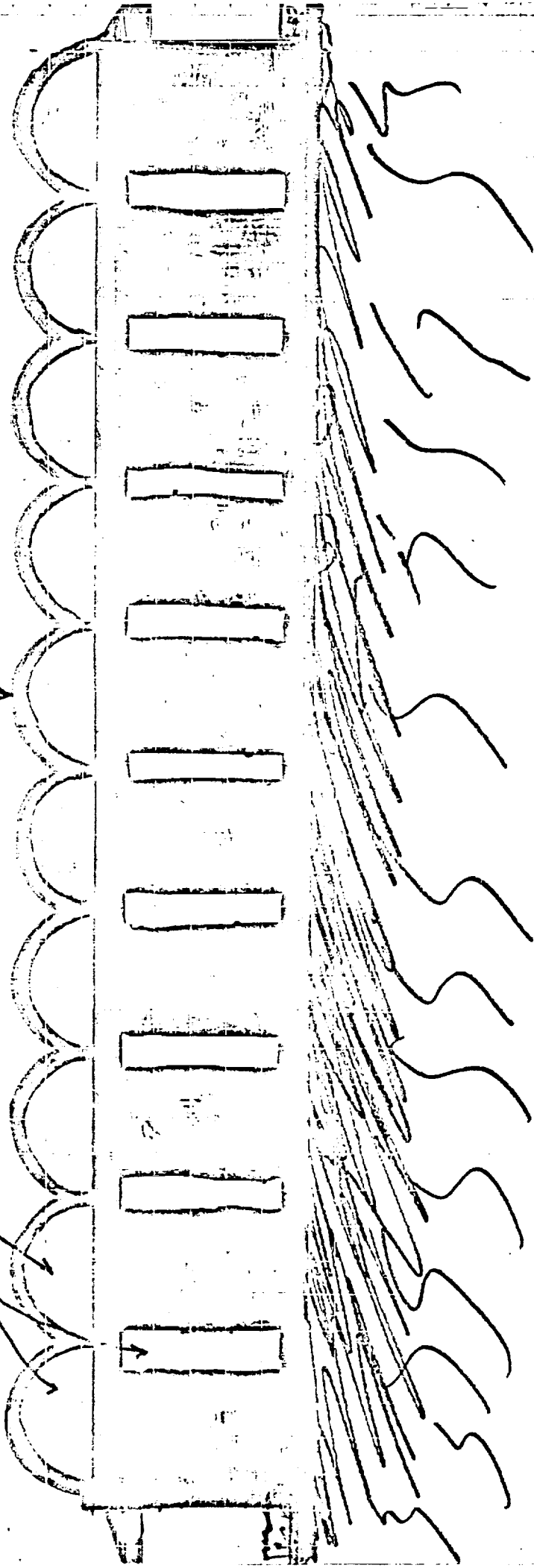
1ST FLOOR SLAB

CUSTOM DESIGN WOOD BLOCKING SYSTEM

RESURRECTION CHURCH JACKSONVILLE

STAINED GLASS WINDOWS

10 CONCRETE ARCHES 70' LONG.



7
8

4. Subbed to Capital Prestressed-Precasting Concrete off site and truck.

This sure took a lot of estimating, but we were successful on the redesign.

Sole Source Too Costly

We were low bidder on the \$200,000 Orlando Catholic Girls High School because we got the latest electrical sub-bid winning out over H. J. High of Orlando in 1961. High got the contract for the St. Charles Elementary School job one hour earlier and thought he had the high school. Steel Floor and Roof Deck was shown on the drawings, however, H. H. Robinson Q-Deck was specified as sole source. The deck bid at over \$20,000. A factory strike caused delivery delay causing us to justify using Fenestra Decking saving \$4,700 proving that sole source can be costly.

New Added Plus for Lift-Slab

This story is about a method our old superintendent showed us when he went to build a 6-story concrete precast lift-slab dormitory for Jacksonville University. After precasting the slabs, he layed out and loaded them with roofing materials, masonry, etc., and then lifted them in place with special hydraulic jacks, thus saving time and labor getting materials in place; thus, a new added plus for the old lift-slab method. (See Sketches of Lift-Slab Dormitories)

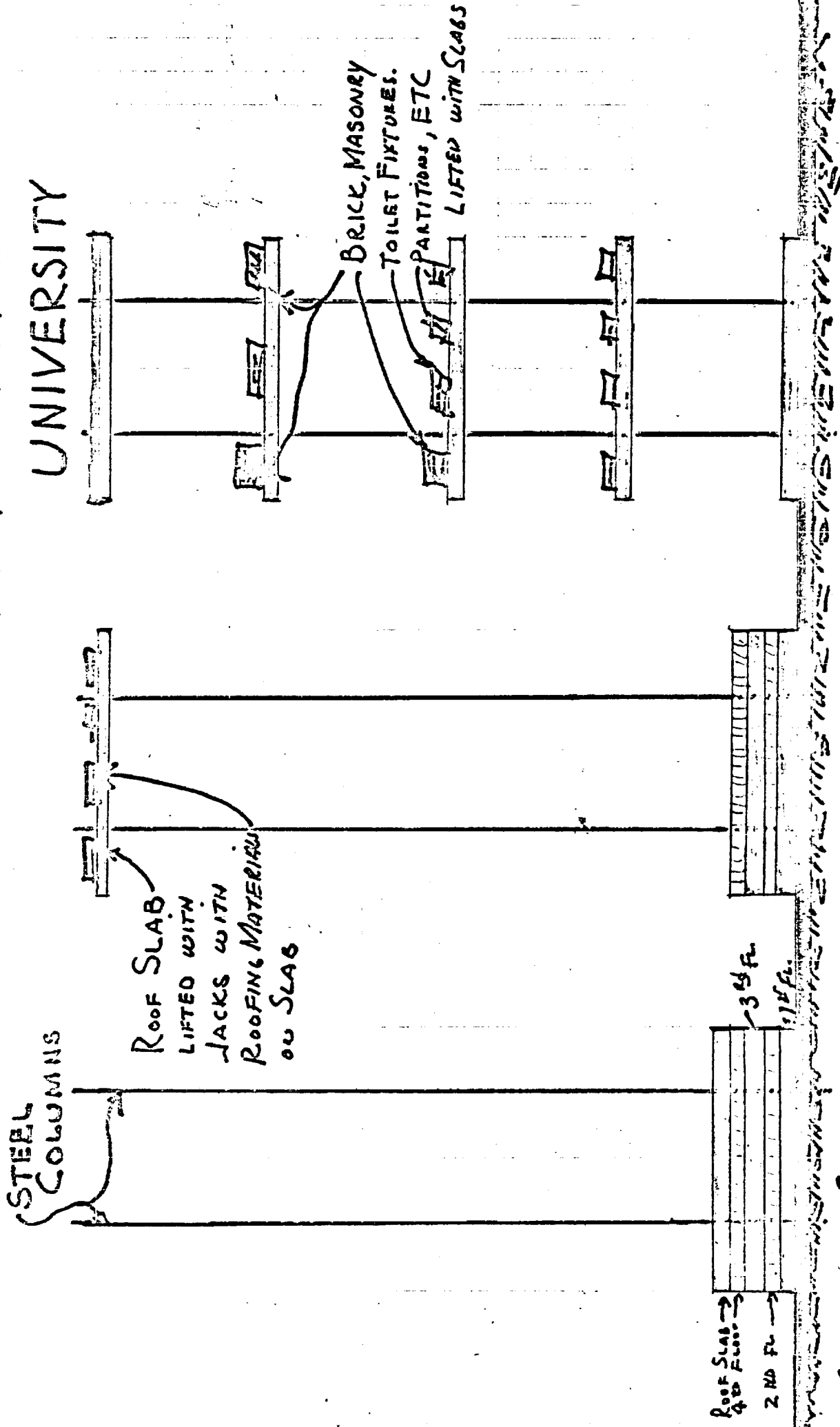
Foreign Contractor Got Low with Super Method

This is one I read about in 1964-65 Excavating Engineer Magazine. A portion of I-4 through Orlando, Florida, was bid and the low bid was about a third low. The low bidder was a foreign contractor, that is he was from the "North," and all the local bidders were saying "He can't do it for that bid." since they knew their cost for doing it the conventional way which involved hauling the fill dirt from the Barrow Pit several miles north of Orlando. This basically was an earth moving job. The low bidder's solution or "method" was so simple it was right under all their noses - or boats. He had gotten an option from the owners of a nearby lake and made his money by dredging the adjacent lake for fill thus saving considerable hauling and excavation costs and the lake property owners were happy with their new deeper lake. (This was before the ecology concern of the 70's.) This story was later confirmed by Charlie Rex, a student of my course, "How To Sharpen Your Bidding," and a former State Road Department official from Orlando later a General Contractor.

LIFT-SLAB DORMITORIES

JACKSONVILLE

UNIVERSITY



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Pre-Fabrication and Union versus Open

This seventh story is confirmed by another former student of mine. Akwa-Downey of Milwaukee, Wisconsin, was low bidder on two new Umbilical Towers at Launch Complex 17, Cape Kennedy, Florida. The bids were:

1. \$244,742 - low bid
2. \$274,412
3. \$275,223 - Government estimate
4. \$287,634
5. \$292,100
6. \$303,385
7. \$340,000
8. \$418,073
9. \$444,475
10. \$483,675

Study these and you will notice a wide bid range; in fact, the high bid is almost twice the low bid. METHODS were probably most responsible for the unusually wide bid range. The low bidder had the towers pre-fabbed and trucked to the site saving on-site erection time and money. (See Picture LC-17 Service Towers)

Akwa-Downey had his open shop independent ironworkers erect the first tower noting his laborers hours and costs. Due to Union pressure and to give them a chance at doing a job for the company, Akwa-Downey let the Union ironworkers erect the second tower. The Union cost was competitive this time because the Union had the special incentive to prove that they could be as successful as open shop ironworkers.

Lawyers Get This One

Another story is about a Cape Kennedy alteration job. The Launch Complex 34 Service Structure Alteration for Saturn 1B bid October 14, 1964. The bids were:

1. \$3,533,333 by McDowell Wellman of Cleveland, Ohio
2. \$3,545,000
3. \$3,678,000
4. \$3,773,540
5. \$4,505,432

Mr. Duffey of M.W. volunteered as they were finishing this job that "their lawyers helped get this one." They proved to the State of Florida that the Mobile Service Structure was a moving vehicle with its own wheels and track, which it is. They then got an auto tag for it and a sales tax exemption number thus saving the 3% sales tax. You can look at the bids and see that \$11,667 is less than 1/2% under the second bid. (See Picture of R.R. Wheels on MSS)

Pre-Fabbed and Welded

This ninth story involves another Mobile Service Structure - the big one at Launch Complex 39 for the Saturn V Moon Rockets. It was bid on September 15, 1964. The bids were:

1. \$11,587,000 - low bid by MKPH Joint Venture
2. \$11,273,795 - Government estimate
3. \$12,581,700
4. \$12,653,000
5. \$12,855,000
6. \$14,373,000
7. \$12,900,000

Almost \$1,000,000 separated the low bid from the second low bidder. METHODS were again important as the steel-welded tubing framing was pre-fabbed and barged to the site in large sections saving on-site erection cost. A value engineering proposal by MKPH for welding instead of bolting added to their profit margin and saved NASA some dead load (weight) on the Crawler-Transporter which was very important.

Open Shop versus Union

My tenth story is especially dear to me, as it was my largest estimate at that time -- the Vehicle Assembly Building (VAB) Outfit High Bay #2 bid December 6, 1966. The bids were:

1. \$6,592,295 - low bid by Akwa-Downey
2. \$6,838,392 - Government estimate
3. \$6,938,000
4. \$7,087,000
5. \$7,112,000
6. \$7,262,000
7. \$8,673,680

Ted Elhass of Akwa-Downey said they were really happy with their bid -- since they were open shop contractors and the others were Union. This confirms what Mr. Bill Jones of Daniels Construction said at Florida Section's (AACE) second symposium on "Construction Cost Escalation and Labor Productivity -- What Can We Do About It???" What open shop construction adds up to is:

1. Savings of 30% of Labor Cost over Closed Shop
2. Reduction of Construction time by about 15%

Open shop construction is the use of non-Union craft workers. This is possible since Florida is one of the twenty Right-to-Work States where all men are entitled to work whether they are a member of a Union or not.

Methods, Pre-Fabbing, Subs and CPM Right Combination

My last story is also about Launch Complex 39, the Vehicle Assembly Building (VAB), NASA Contract 61, bid January 7, 1974. The bids were:

1. \$61,260,531 - Government estimate
2. \$63,366,378 - low bidder MKPH Joint Venture
3. \$69,266,000
4. \$69,480,000
5. \$74,260,531

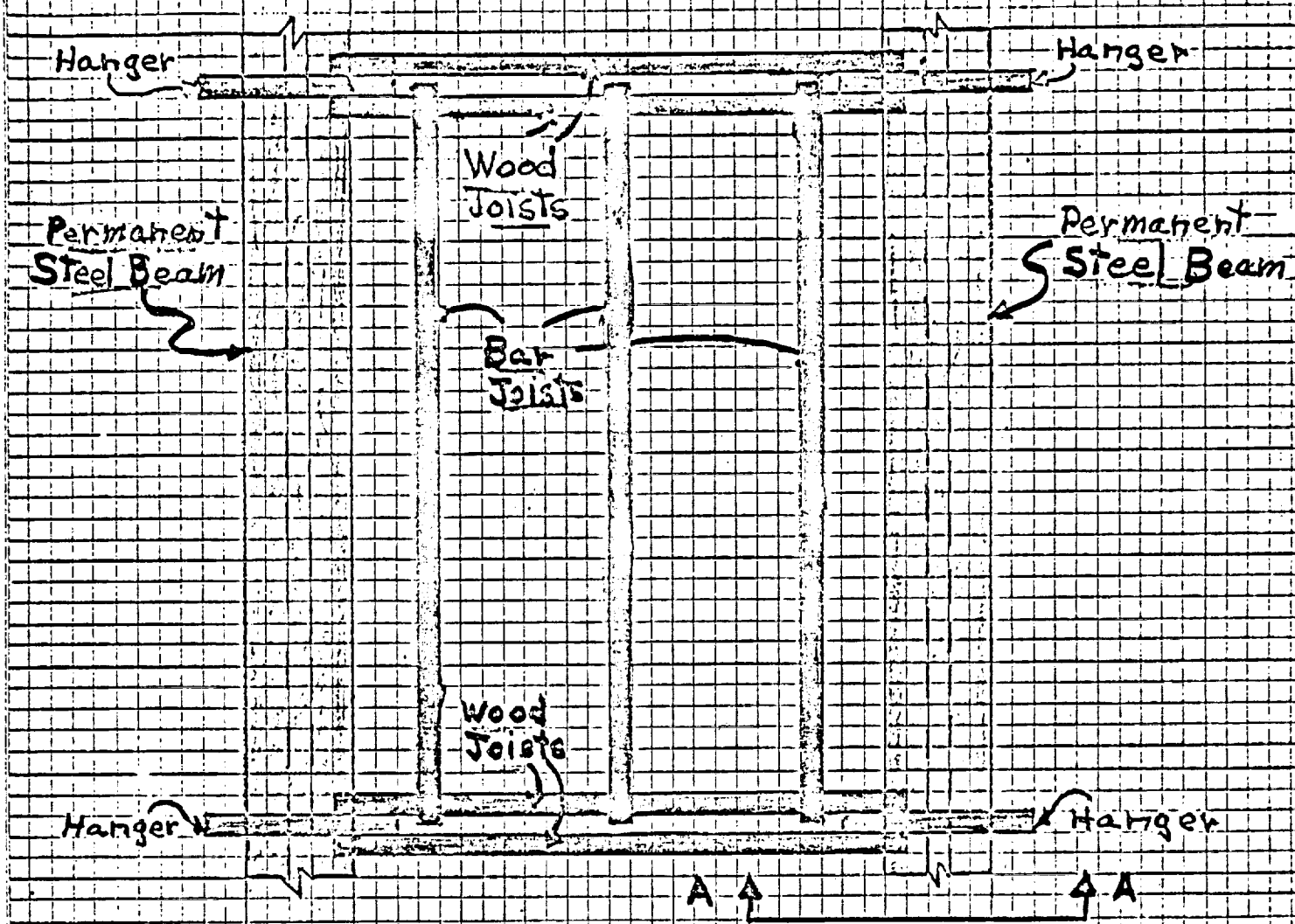
Notice the almost \$6,000,000 between the low bidder and the second low bidder. That's quite a bit to leave on the table. Almost 10%, but that's the low bid system that keeps contractors competitive. Mr. Frank Robertson, Project Manager for MKPH, told me four years later in 1968 at the Society of American Military Engineers national convention in Cocoa Beach, that his company saved about \$6,000,000 on the composite structural and miscellaneous steel bid by analyzing it and doing some work themselves and subbing the balance to other subcontractors instead of subbing the whole package.

Some of the special or unusual methods that saved money on this complex building were: (See my first technical paper entitled "Launch Pad to the Moon" Construction Bid Cost of LC-39 - 1968.)

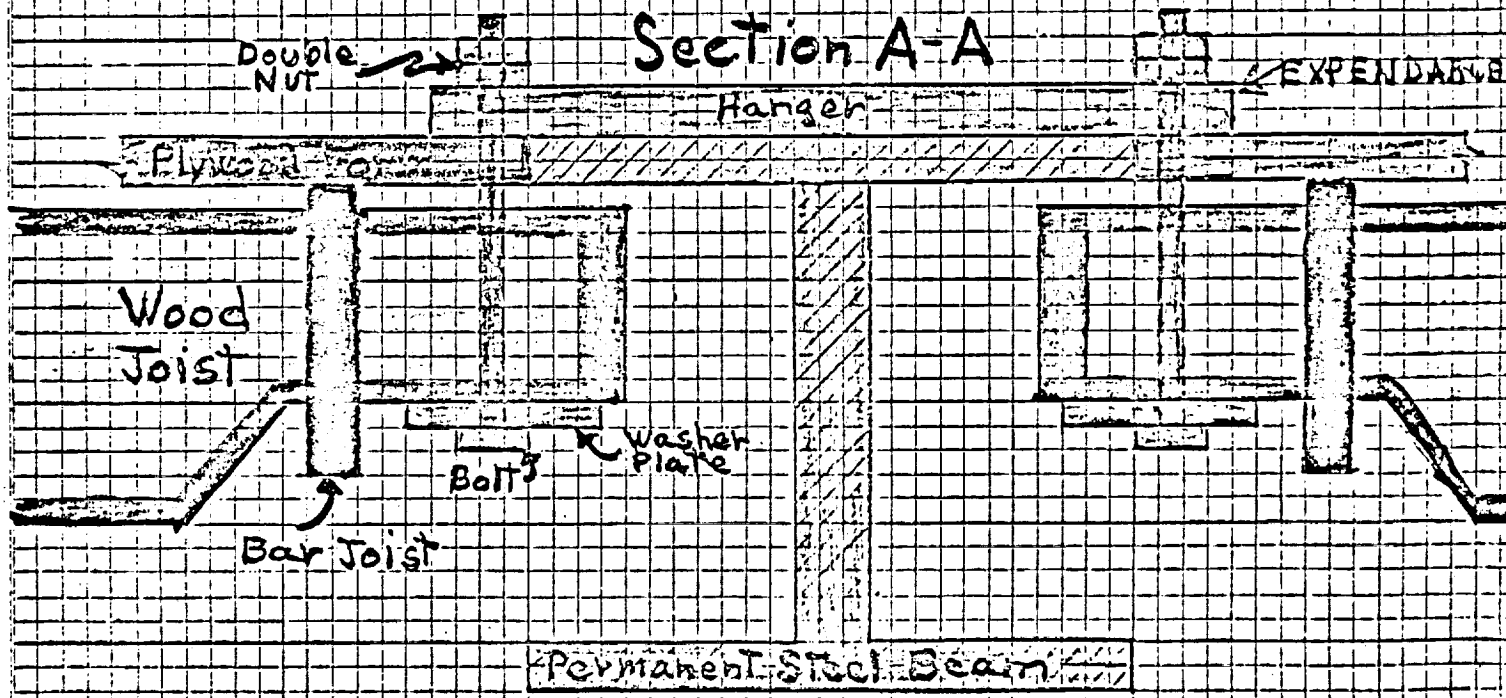
1. Using (custom-built) siding rail cars (3 stories high) that run on the building's steel framing to install \$1,085,000 square feet of insulated aluminum panels and 70,000 square feet of plastic panels. (See picture of Siding Rail Car)
2. A special beam hangar system for suspended concrete slabs, saving shoring (500 feet high) and scaffolding cost. (See sketches, Slab Forming Operation)
3. Pre-fabricating extensible platform on the ground and hoisting the completed units in place with 250-ton overhead crane.
4. The use of helicopters for lifting antenna and special equipment, siding, etc. onto roof, etc.
5. The use of critical path method -- a powerful management tool to force detailed planning and scheduling with the aid of computers and sophisticated charts to monitor construction based on arrow diagram to emphasize the shortest time for construction -- for planning and scheduling. Because of complex and unusual magnitude of this project, I doubt if it could be built without it in the required timeframe.

So, as you can see from these stories of construction projects, that the low bidder can successfully complete the job through ingenuity, hard work, efficient management, creativity, good labor productivity, and that

Plan View



Section A-A





13
14

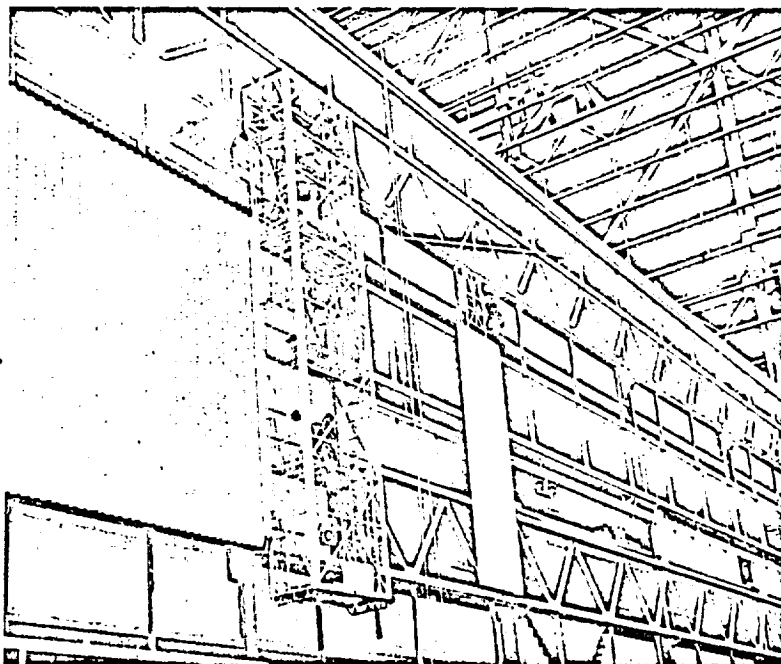
FLOORS: Developed floor area in the VAB totals 1,500,000 square feet. The floors above ground level are four-inch thick, lightweight reinforced concrete slabs.

The Low Bay of the building has three floor levels plus a mezzanine. The High Bay has 26 fully developed floors.

PANELING: Exclusive of doors, the VAB is inclosed with 1,085,500 square feet (23 acres) of insulated aluminum siding and 70,000 square feet of light-emitting plastic panels.

The aluminum siding is designed not only to stabilize thermal effects but also to reduce acoustical pressures created by the launch of a Saturn V.

The translucent panels were designed to provide workers in the VAB with a point of reference to the outdoors without admitting glare or the direct rays of the sun.



Installation of Insulated aluminum paneling on exterior of Low Bay, Vehicle Assembly Building.

Siding Rail CAR.

imagine-engineering ability to see beyond the adding up of numbers to actually effect their selection to be successful. The selection of the most efficient methods by imagination and ingenuity is one of the most important ingredients for successful construction at a profit.

I challenge you to write a case history or study of your most successful project so we may all learn from your experience.